

FINAL REPORT
DAVID LISTON FATALITY / THOMAS ROACH MALFUCTION

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This final report is intended as an attachment to the report of the Serious Accident Investigation Team. It will not be clear to a reader unfamiliar with the content of the team's report.

While the exact occurrence in either incident cannot be determined with certainty, it is clear that the drogue did not release on time for either jumper. The freezing loop theory is plausible for either jumper, and the blocked 3-ring theory is equally plausible. The aerodynamic / turbulent effects were clearly at play in the entanglement of Liston's reserve pilotchute with his drogue bridle.

I believe that Liston's bellyband Fastex snap quite possibly did release prematurely because all of the other 3 Fastex snaps failed identically on impact. None had fractures remotely similar to those on the bellyband snap in question.

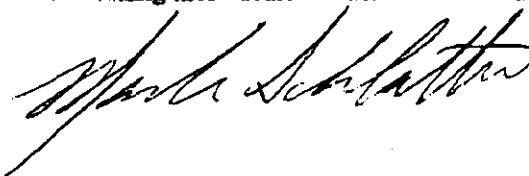
The blocked 3-ring theory is plausible for both drogue-in-tow malfunctions. Whereas, the drogue pouch at the top of the main container can contact the 3-ring mechanism under normal circumstances, movement of the main container following release of Liston's bellyband might explain why Roach's drogue did release on its own but Liston's apparently did not release until later in the descent.

The aerodynamic component to Liston's entanglement scenarios is, in my view significant. I know from experience that a burble - the low pressure above a falling object - can drastically affect the trajectory of a pilotchute. It is easy to envision the pilotchute encircling the drogue as it is tossed about by this turbulent phenomenon. It is logical that the ZP drogue (Liston's) will have a stronger burble effect than a used F-111 drogue (Roach's.) The two fabrics have very similar permeability and performance characteristics when new. F-111 relaxes significantly; its permeability increases during the first several jumps. Roach's F-111 drogue was not new.

It is impossible for me to speculate on the extent to which a misdirected launch of Liston's reserve pilotchute was the outcome of a separated bellyband. I believe the pilotchute launch trajectory could be altered significantly by movement of the reserve container - especially movement as may be caused by the pressure from the PG-bag. But no evidence leads me to any specific conclusion on this point other than to say that the launch trajectory is substantially less predictable under such circumstances.

My recommendations are the same as those contained in the report from the investigation team with additional emphasis on elimination of plastic fasteners in any structural application and response to the simple changes recommended by 3-ring inventor Bill Booth. I believe it is impossible to eliminate all risks involved with parachuting. The record of just 4 jump-related fatalities in 60 years of smokejumping is - by comparison to hazardous occupations - outstanding.

I am compelled to state from my outside observer's perspective that the BLM smokejumper program radiates with excellence. The personnel I met and consulted with during this investigation were dedicated professionals with impressive knowledge and skills. The facilities I inspected were clean, well organized, and remarkably well equipped. The parachute equipment they use is highly evolved and effective. The training they provide - both initial and recurrent - is superior to that provided by commercial centers in the sport parachuting industry. In short, it is my opinion that the BLM smokejumpers are managing a hazardous mission with a thorough and safe professionalism worthy of genuine pride to all who participate in the efforts. I hope the respondents to the SAIT report will be swift in implementing the necessary steps for returning these dedicated men and women to the conduct of their valuable service.

 6/19/00